

CA20N
EU 530
1972
R281



ONTARIO

Ministry of the ENVIRONMENT



Water Pollution Survey
Community of Lavigne
District of Nipissing

1972

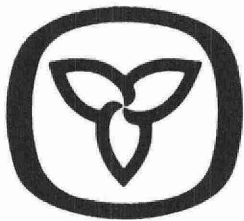
Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

MF



Environment Ontario

CADON
EV530
1972
R281

REPORT
ON A
WATER POLLUTION SURVEY
OF
THE COMMUNITY OF LAVIGNE
DISTRICT OF NIPISSING

DISTRICT ENGINEERS SECTION
SANITARY ENGINEERING BRANCH

1972



TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 General	
1.1.0 Location	1
1.2.0 Description	1
1.3.0 Topography	2
1.4.0 Drainage	2
2.0 WATER USES	
2.1 Water Supply	3
2.2 Recreational	3
3.0 WATER POLLUTION	
3.1 Sanitary Waste Disposal	3
3.2 Refuse Disposal	4
4.0 ANALYSES RESULTS AND INTERPRETATION	5
5.0 SUMMARY AND CONCLUSIONS	7
6.0 RECOMMENDATIONS	8
APPENDICES	
TABLE	
MAP	

1.0 INTRODUCTION

The Ministry of the Environment is concerned with the management of the Province's water resources as they are related to water supply, waste water disposal and other areas of use. In keeping with this responsibility, staff of the Ministry examine water quality in areas of active and potential use. This survey was made to locate and record any significant sources of water pollution in the Community of Lavigne and to make recommendations concerning abatement. It should be realized that the above community and the township in which it is located are unorganized.

In October of 1970 and May of 1972, water samples for bacteriological and chemical examinations were collected from surface waters and all of the known discharges to these waters. The appendix to the report includes results of the samples collected in October, 1970 and May, 1972, an interpretation of the various tests and an outline of water quality and effluent objectives in Ontario. A map of the community showing the sample point locations is also appended.

1.1 General

1.1.0 Location

The Community of Lavigne is located on Highway No. 64 at the western end of Lake Nipissing. The main development area is adjacent to Northwest Bay and Lavigne Creek, both of which are tributaries of the lake.

1.2.0 Description

The nucleus of this community consists of approximately 50 permanent homes and 15 summer residences. The outlying areas along Northwest Bay consist of numerous cottages and camps which cater to the seasonal tourist trade. The

majority of the working population is either self-employed in the tourist business or commutes to jobs in outlying areas such as Verner and Sturgeon Falls.

1.3.0 Topography

The community site is located adjacent to Lavigne Creek at the shoreline of Northwest Bay, an inlet of Lake Nipissing. The topography consists of a flat lacustrine clay overburden with frequent rock outcropping within the developed area. The outcropping locations are indicated on the appended map of the community. It is noted that two of the summer camps which are located on Caron Road just outside the community have constructed sewage lagoons. These camps are Camp Deluxe and Back Bay Lodge which are located west 3/4 and 1 1/2 miles respectively from this area. The overburden in these locations is a fine clay which is ideal for lagoon construction. It is evident that this material is similar to that of the community in question, notably, in the flat area north of Caron Road and the public school.

1.4.0 Drainage

This is effected by roadside ditches and the two creeks. Drainage east of Highway 64 is directed to Lavigne Creek which is a seasonal watercourse. Water in this creek, especially in the area of the mouth, is stagnant with duckweed becoming prevalent in the latter months of summer.

West of Highway 64, drainage is effected by a small seasonal creek which originates from the clay flat north of the school and runs south crossing Caron Road to Northwest Bay. At Caron Road this creek picks up flows from both the north and south side road ditches, and septic tank effluents. It is evident that these effluents are directed from the public school

on the north side (4-inch diameter asbestos concrete pipe) and the houses on the south-east corner of the junction of the creek and the road.

2.0 WATER USES

2.1 Water Supply

The majority of homes within the community receive water from dug wells. Jurisdiction of this unorganized township was undertaken by the North Bay and District Health Unit within the past two years. There have been no recent reports of well contamination. Representatives of the Northern Ontario Public Health Service were contacted as they were previously involved with this area. This agency reported that low bacterial counts have been encountered in samples collected from some individual wells. It was indicated that well protection was being effected because of the fact that most septic tank effluents were directed to watercourses. Bearing this fact in mind, it is conceivable that with the installation of tile beds in the community, the threat of well contamination will increase accordingly.

2.2 Recreational

Northwest Bay and its tributaries are used extensively for resort purposes such as boating, swimming and fishing. Rental boats provided for tourists are maintained both within the creek mouth and on the shoreline of the bay.

3.0 WATER POLLUTION

3.1 Sanitary Waste Disposal

Sewage within the community is disposed of by septic tank and tile bed systems, by direct discharge pipes and by pit privies.

Because of the extensive clay overburden in the area, septic tank and tile bed

systems frequently do not operate properly. Tile beds in most cases are laid in native clay. In several locations it is evident that septic tanks have direct discharge pipes to the watercourses. This is most evident with the cabins and homes near the mouth of Lavigne Creek and the homes on the east side of Highway #64 extending as far north as the Co-Op building.

It was reported by the area inspector from the North Bay and District Health Unit that approximately 40 orders had been issued for the construction or refurbishment of septic tank and tile bed systems. It is also reported that tenders are being called for the reconstruction of the existing tile bed system for the public school. Reportedly, only a few tile bed systems have been installed in recent years as they are very expensive. Because of the existing **clay overburden**, at least four feet of adequate granular material must be brought in. With this large volume of material being required, the total cost of a single domestic system may approach \$2,000. It is evident that these completely artificial tile bed systems will eventually create problems, notably as lots are generally small and individual dug wells are utilized in most cases.

3.2 Refuse Disposal

Refuse is presently disposed of on a rock outcropping which is located on private property approximately one-quarter of a mile south of the community adjacent to Highway #64. This dump site, as it has proven to be unsatisfactory, will be relocated in the near future.

4.0 ANALYSES RESULTS AND INTERPRETATION

The laboratory results of bacteriological examinations and chemical analyses of the samples collected from the ditches, creeks and outfalls are appended to this report. The bacteriological samples collected on October 22, 1970 were examined by this Ministry's laboratories at Islington Avenue and Hwy. 401 in Toronto while the samples collected on May 16, 1972 were examined by the Public Health Laboratories in North Bay. All chemical samples were analyzed at the Ministry's laboratory in Toronto.

A plan of the Community of Lavigne, which is appended, indicates the approximate location of all sampling points with respect to streets and landmarks.

Appended to this report is a glossary of terms which describes the different methods of analyses and examination and their interpretation as related to the objectives of this Ministry.

During the original survey on October 22, 1970, samples were collected from the roadside ditches on Caron Road, from a small creek in this location and from Lavigne Creek. A sample of discharge from the hotel was also collected at this time.

The chemical analyses of the discharge sample collected at the ditch south of Caron Road (7) indicates both a BOD (biochemical oxygen demand) and suspended solids concentration of 60 ppm which far exceeds this Ministry's objectives for surface waters. Analyses results of the effluent sample from the hotel indicate a similar condition. Bacteriological examination

of samples, collected during this initial inspection, indicated that faecal coliform organisms were present in all cases. High concentrations of these organisms were present in the creek and ditch along Caron Road, the hotel discharge sample and sample location points 7, 8 and 12 respectively.

This Ministry's objective for surface water is that total coliform organisms do not exceed 1000 per 100 ml of sample and that faecal organisms do not exceed 100 per 100 ml. The presence of faecal coliform organisms is indicative of pollution by domestic sewage.

Samples which were collected later on May 16, 1972 indicated faecal coliforms to be similarly present in all cases. Sample 6 contained extremely high faecal coliform counts of 3 million per 100 ml. This sample was collected from the 4-inch diameter A. C. pipe located on the north ditch on Caron Road just south-east of the public school. It is evident that this is the effluent pipe from the existing school's tile bed system. High concentrations of faecal coliforms were also present at Sample Point 4, 8 and 10. These examination results indicate that sewage is present in the ditches on Caron Road and in the creek adjacent to the public school and in all the areas of Lavigne Creek. A sample of Lavigne Creek at the mouth was collected for chemical analyses. The results indicate that the BOD at this location was 30 ppm which far exceeds the generally accepted range for surface waters; the BOD of natural water is usually below 4 ppm. Phosphorus and nitrogen concentrations were found to be high at points 3 and 8. The generally accepted maximum limit for these parameters are 0.02 ppm and 0.5 ppm respectively for natural surface waters. These increased concentrations of nutrients indicate that sewage is gaining access to the watercourse.

The obvious sources of pollution in the area of Lavigne Creek are septic tank discharge pipes from homes and cabins on the banks of the creek. A four-inch diameter cast iron pipe carries the hotel's septic tank effluent to this creek. This location is displayed in the appended photograph, No. 2. It was evident from viewing several homes along this creek bank that sewage was discharging directly to the water. In the area of Caron Road and the small creek, there are two obvious discharge pipes. It is apparent that septic tank - tile bed systems do not operate successfully with the existing clay overburden.

The existing situation in this community is a health hazard as contaminants are being discharged to areas of recreation, to public road ditches and reportedly have gained access to private wells.

Because of the unsatisfactory soil conditions it is unlikely that adequate domestic waste treatment may be obtained by the continued use of septic tank and tile bed systems.

It is evident that a communal sewage collector and treatment system is necessary for the abatement of the sewage disposal problems and associated health hazards.

5.0 SUMMARY AND CONCLUSIONS

Water pollution surveys of the Community of Lavigne were conducted on October 22, 1970 and May 16, 1972.

The condition of **watercourses** and creeks within the community appeared to be unacceptable. The absence of treatment facilities or the malfunctioning of septic tank and tile bed systems result in the discharge of untreated, or inadequately treated, sewage to drainage ditches and creeks. There have

also been reported incidents of well contamination within the community.

It would appear that a communal sewage collector and treatment system is the only solution to the existing pollution problems within the community.

6.0 RECOMMENDATIONS

It is recommended that:

1. A program be initiated involving the construction of a sewage collector and treatment system for the community. The treatment facility should preferably be one of a non-effluent producing type. Prior to this, it may be advantageous for the township to obtain an organized municipal status.
2. In the interim, building expansion within the community should be withheld.
3. Consideration should be given to the degree at which the existing disposal systems are presently being upgraded.

Prepared by:.....

G. K. Graham, Technologist
District Engineers Section
Sanitary Engineering Branch

/cs

GLOSSARY OF TERMS

BACTERIOLOGICAL EXAMINATIONS - The Most Probable Number Technique is used by the Ontario Department of Health to obtain an approximation of the actual number of coliform organisms present. The Membrane Filter Technique is used by this Ministry to obtain a direct count of coliform organisms. These organisms are the normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large numbers in untreated sewage and are, in general, relatively few in other stream pollutants. This Ministry's objective for recreational waters in Ontario is a total coliform count not greater than *1000 per 100 ml and a faecal coliform count not in excess of *100 per 100 ml.

*A geometric mean density of at least 10 samples collected per month.

BIOCHEMICAL OXYGEN DEMAND (BOD) - The biochemical oxygen demand test indicates the amount of oxygen required for stabilization of the decomposable organic matter found in sewage, sewage effluent polluted waters, or industrial wastes, by aerobic biochemical action. Discharges of oxygen consuming wastes (BOD or COD) should be limited to a level which will not cause depression of dissolved oxygen concentrations below 6 mg/l in receiving waters supporting cold water fisheries and 5 mg/l in receiving waters supporting warm water fisheries.

SOLIDS - The analyses for solids include tests for suspended and dissolved solids. The total solids is a measure of the solids in solution and in suspension. Suspended solids indicate the measure of undissolved solids of organic or inorganic nature whereas the dissolved solids are a measure of those solids in solution.

TOTAL KJELDAHL - is a measure of the total nitrogeaneous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

TOTAL PHOSPHORUS - Phosphorus in relatively small concentrations is common in natural fresh waters. Total phosphorus concentrations of 0.01 ppm and less will not encourage algae growth. This is generally held as a maximum desired limit.

Photo #1

Looking southeast from rock outcropping at Junction of Highway #64 and Caron Road. Note characteristic flatness of clay overburden. Lavigne Hotel and post office are evident in background (white frame building and red brick building respectively).



Photo #2

Looking northwest from private bridge over Lavigne Creek. The effluent pipe (4" C.I.) from the hotel is evident in the centre of the photo (sample point #12). Other sewage effluents are hidden immediately to the right of the photo.



Photo #3

Looking east from Highway #64 across Lavigne Creek. Sewage from the building immediately to the left is openly directed to the creek with no apparent treatment. The left cottage on far bank has just received the repair and reconstruction of the septic tank effluent pipe to the creek. It is evident just below the cottage. This method of disposal is typical.

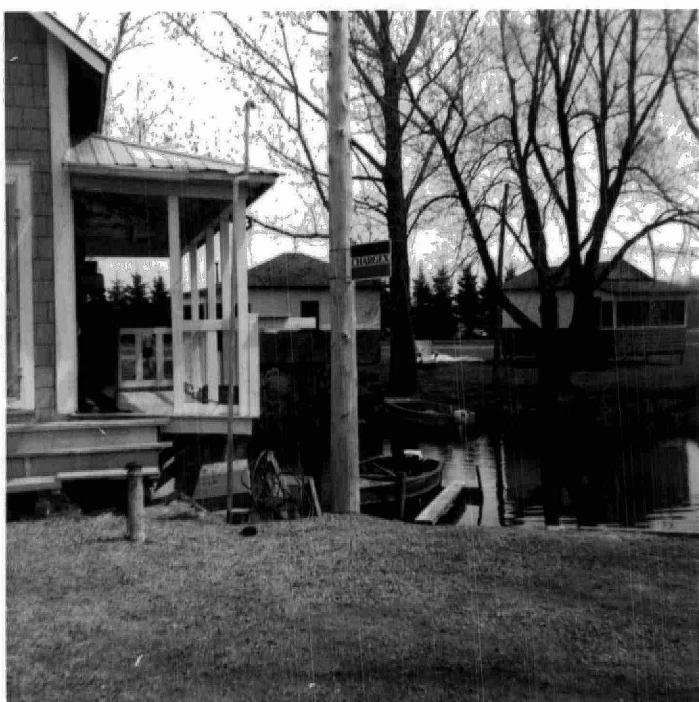


Photo #4



Looking south from private bridge towards Northwest Bay. This picture portrays the recreational activity in the area. None of the residences in this picture have adequate sewage disposal systems. The building on the right discharges sewage directly to the creek (Standard cast iron sewage pipe can be seen at the base of the building).

Photo #5

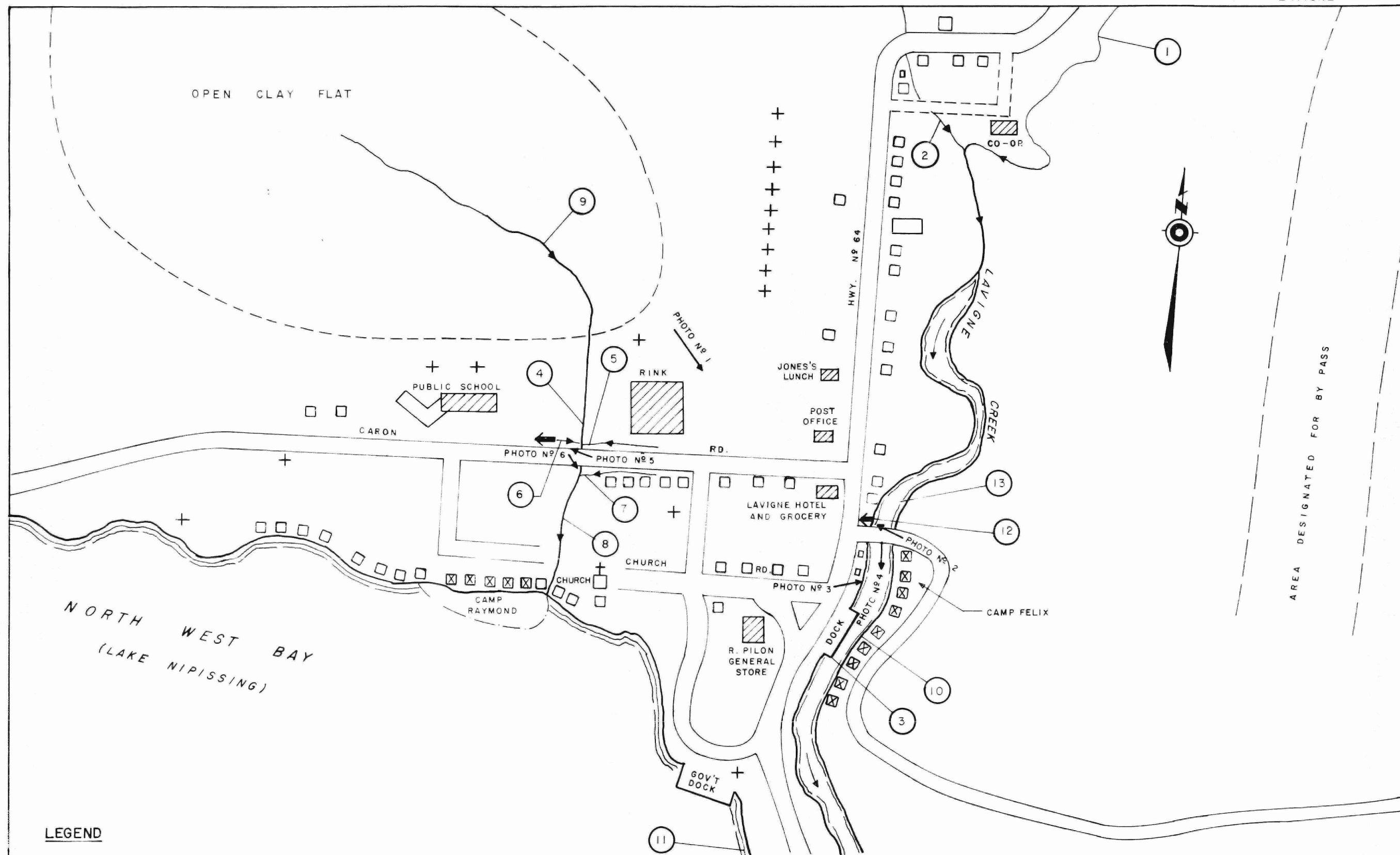
Looking northwest from Caron Road at the public school. The 4" diameter asbestos concrete pipe (sample location #6) is evident at the lower left. This is reportedly septic tank effluent. The creek is immediately below the photo.



Photo #6

Looking southeast from Caron Road at the Creek. Sewage effluent is evident from centre of photo (sample location #7) and runs south towards Northwest Bay.





LEGEND

- ← - OUTFALL PIPE
- + - ROCK OUTCROP
- ☒ - COTTAGE
- - PERMANENT RESIDENCE
- ⑩ - SAMPLING POINT

ENVIRONMENT ONTARIO
COMMUNITY OF LAVIGNE
WATER POLLUTION SURVEY
1972

SCALE: 1" = 300' Approx.

DRAWN BY: L.L. BROOME DATE: JULY, 1972

CHECKED BY: G.G.

DRAWING NO: 72-35-DE



96936000009359